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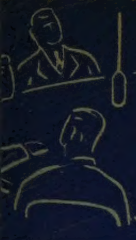

Round Table

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The Psychiatrist's Contribution to the Concept of Health and Disease

An NBC Radio Discussion by GEORGE L. ENGEL
ROY R. GRINKER *and* M. RALPH KAUFMAN

Including

MIND AND MATTER

By W. RUSSELL BRAIN

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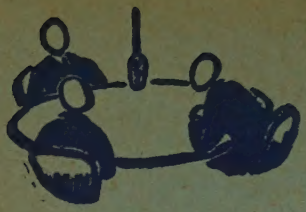

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Mind and Matter. *By* W. RUSSELL BRAIN . . . . . .

THE UNIVERSITY OF CHICAGO ROUND TABLE
GEORGE E. PROBST, *Director*
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899th Broadcast in Cooperation with the National Broadcasting Compa

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The Psychiatrist's Contribution to the Concept of Health and Disease

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Dr. Grinker: The subject of today's discussion is a difficult and important subject. As a matter of fact, there is considerable difficulty in explaining this contribution which the psychiatrist can make to our understanding of the causes, development, and treatment of disease.

Dr. Kaufman, what is your understanding of this psychiatric contribution?

Dr. Kaufman: Perhaps the best start toward such an understanding and explanation is the very fact of the recent dedication of your new institute. Perhaps it is given in the name of the Institute—the Institute for Psychosomatic and Psychiatric Training and Research. This is an indication of the changing trend in medicine and is explanatory, in a way, as to why and what kind of role the psychiatrist plays at the present time.

The fact that the Institute is part of a general hospital rather than isolated from it is the most important aspect of our discussion today.

Dr. Grinker: The word "psychosomatic" in the title, of course, includes the mind and the body and their relationship. It really means an approach to health and disease which is comprehensive. This field of comprehensive medicine brings to bear on the problems of human beings in health and sickness concepts, attitudes, and procedures which are broad and include most of the factors. Would you agree with that, Dr. Engel?

Dr. Engel: Yes, I think that one should emphasize that comprehensive medicine essentially is an approach but an approach which broad-

ens the traditional concepts of medicine. It is an approach which tak into account all the environmental factors—biological factors, psych logical factors, social factors—which may have bearing upon illness a health and upon whether or not a person remains well or falls sick.

DR. GRINKER: Well, that differs considerably from the tradition point of view in medicine. Actually the common concept of disease the minds of lay people and unfortunately in the minds of many me cal individuals has been that disease is something which comes fr without, like the possession of a demon, and actually in our mass co munications through magazines and the press people have been led believe that there is something which gets hold of them, somethi which gets into them—sometimes because of their own responsibility and which produces specific illnesses. Today we believe, however, th the external agents, such as germs, representing stresses which co from without the individual, are on rather equal terms with stres which are inherent within the individual.

These things are very difficult to discuss in specific ways, because people suffer from some kind of difficulty, and we do not want to tou upon specific diseases.

Now, the word "disease" has been used. How do we define it?

DR. KAUFMAN: The word "disease" can be separated into "dis-ea which is really a kind of discomfort, a lack of ease as opposed to other concept. Actually what we talk about when we talk about ease in the human and in the animal is an attempt to adapt to a se of stress reactions. The difference between health and disease may a quantitative rather than a qualitative one. Dr. Engel has talked ab comprehensive medicine. How does that fit into your idea of comp hensive medicine?

DR. ENGEL: You have raised a very important concept when you e phasized the actual meaning of the word "dis-ease" in its sema sense and brought out the fact that health and disease are actu phases of life-processes. We need to consider disease not as a qua tatively separate thing but rather as a process. If we take the view t ordinarily we attempt to maintain ourselves in a state of comfort, i state of ease, that we are constantly bombarded by a variety of stresse stresses which come from without, stresses that express certain need

ır own—we will recognize that we are always in a situation in which e are attempting to adjust.

DR. GRINKER: But the kind of adjustment about which you are talk- g has an implication that a person can do something about it. Do you ɔt really mean that in the organism there are many levels of adjust- ent or adaptation to stress? For example, there is the adjustment hich occurs within the cells and the fluids of the body, which we may ll biological. There are adjustments which occur by virtue of the tion of the person himself—what he does to avoid stresses; what he ɔes when he meets them—and there are the adjustments which he akes in life-situations, both in health and in illness, in relation to her people, which might be called social adjustments.

DR. KAUFMAN: The question of adjustment, it seems to me, brings up great many important factors. One can think in terms of the current tuation in an organism which is adjusting to a current series of resses either well or poorly. It either is making an adequate adjust- ent or is failing.

But it seems to me that from our point of view as psychiatrists who e familiar with and deal constantly with the life-history of the indi- dual, both in the biological and in the psychological sense, we must mphasize that it is the life-history of the individual in its totality and rticularly his past experiences which play a role in what kind of ad- stment he will make to what kind of situation at this or any other me.

DR. ENGEL: I think an example of what we have in mind is called for. ne could take almost any illness to illustrate this. Perhaps a con- enient one would be to take the example of tuberculosis. In tubercu- sis, it was demonstrated many years ago that a germ, the tuber bacil- s, was important in this disease. We may examine now what happens hen a man, let us say, comes in contact with the tuber bacillus. We ay view his response to the tuber bacillus at a variety of levels. At ne level, for example, we may refer to the biochemical, the immuno- gical, the physiological responses to the organism itself.

DR. GRINKER: But most people believe that the disease consists of eing infected by this germ and that that is all there is to it!

DR. ENGEL: That would be too narrow a concept. What the patient

perceives actually constitutes some of the expressions of his attempt adjust, to deal with the invading organism. The patient may thus cor plain of fever; he may have a cough; he may have sputum. All the may be understood in terms of the effort of the organism, of the ma to deal with this invading organism.

However, we also have to keep in mind that there are other levels adjustment, that the patient perceives that something is wrong, ar that he responds to this perception in many possible different ways, d pending in part on his past experience and in part on his current sit ation. So that one person may accept the fact of being ill, go to be call a doctor, and so on. Another person may have a very strong nee to deny that he is ill. Perhaps his current life-situation is such that the moment it would be an even greater stress for him to accept h illness.

And, further, we can speak of the social aspects, not only from th point of view of the social devices which the patient may make use to deal with his illness—such as a sanitarium, social agencies, and so —but we might also mention social attitudes about the illness.

The patient who develops tuberculosis, or any other disease so far that is concerned, then follows some course of treatment. Let us s that he goes to a sanitarium, and let us say, for example, that after period of a number of months the X-ray and the sputum examinatio all indicate that the active infection is over. But it then may happe as it sometimes does, that this patient still feels ill; he cannot get o of bed. The doctor who views this situation from the point of view comprehensive medicine would now recognize that, while this disea is no longer tuberculosis, he is dealing still with an ill person who no needs a different type of treatment.

DR. GRINKER: How would he influence other people?

DR. KAUFMAN: The doctor, or the patient?

DR. GRINKER: No, the patient.

DR. KAUFMAN: There again, if you take tuberculosis as an examp you would have to take into consideration what the meaning of tub culosis would be in a specific community and at a specific time. C tainly tuberculosis meant something different when we called it "co sumption" twenty-five years ago. Whether the man is married; wh

s family relationships are; what his wife feels about this; how she els about the fact that she has an ill husband—all these things become portant.

I would like to elaborate one aspect of Dr. Engel's contribution. He ked specifically in terms of the current situation. Primarily I would like emphasize, what I think we all agree on, that it is not only the current uation but the current situation as such which is viewed and looked on and reacted to in terms of previous life-experience. These life-periences are not necessarily and actually, for the most part, within e awareness of the individual. There is a concept which has been essed, particularly by the psychoanalyst, a concept of the unconscious. his unconscious, and what goes on there, plays a tremendously im-rtant role in disease. For instance, in our own work at Mount Sinai ospital, in recent years, we have been working on certain patients th gastric fistulae. We had an opportunity actually to observe visual-and in various other ways what goes on in a stomach. Some very teresting results came out of this work. From the point of view of e unconscious, it became clear that one kind of need, namely, the nger need, the need for food, can in the unconscious be equated or sociated with other kinds of needs—for instance, the need for love. that it is perfectly logical to say that there is a hunger for food, and, the folk language has it, there is a hunger for love. The interesting ng is that, when the patient is hungry for love, the stomach reacts, terms of the juices, as if it were hungry for food.

To come back again to Dr. Engel's example, one has to take into nsideration this unconscious, I believe, in terms of both the psycho-gical and the emotional—from our point of view here, what the re-ionship is to the psycho-physiology.

Dr. Grinker: You would say, then, that it is in the past experiences an individual, preparing him to react in a particular way to a par-ular situation, that the value and the importance of psychological ex-riences are found. These experiences are of the same nature as physi-l experiences—experiences with previous illnesses, experiences which ve to the individual certain types of immunity. We would say that th these levels of activity which are constantly present remain as ronic tensions which prepare the individual for current reactions to ess situations.

DR. KAUFMAN: Certainly.

DR. GRINKER: There, of course, comes to mind the fact that not stress impinges upon a person who is prepared. For example, duri my work in the Army during the war, we found that even the stron est person, the most stable individual, if given enough strain and stre would react with a neurotic kind of condition, sometimes evidenced anxiety—what the boys used to call "the jitters"—or even with certa physical symptoms such as stomach or bowel troubles. Now in t case, even on a relatively strong individual, when the stimulus beca so severe, the stress overcame the individual's ability to cope satisf torily with it. We must deal then with the intensity, or the rapid in which a stress situation occurs.

Now it is true though that even in these situations some of th present stresses may touch off a past pattern. I can give you a very go example of that. Fliers who were stationed in England and who w successful in enduring combat over Germany lived in clean quart and were given excellent food. When they were asked to fly to Afr on round trips and base themselves in the desert, with a great deal heat and dirt, they reacted to this situation very often with a kind breakdown which we called a war neurosis which had nothing to with combat. Now, these individuals were prepared to react to this p ticular kind of situation involving dirt in a particular way. Therefo both the present stress and the past preparation were extremely i portant.

We have been talking about the influence of psychological fact on cause of disease. What about the course of disease as it is influen by psychological factors?

DR. ENGEL: It becomes clear, I think, from the discussion so far t the course of the disease is going to be influenced by many differ elements. Tuberculosis, for example, cannot be understood only in j what we understand about the tuber bacillus. We now have to und stand that the course of the disease may be influenced by the past perience of the person and also by his current psychological situat and current social situation.

DR. KAUFMAN: This really brings us to what I think is one of central factors or central points in our discussion. What we have b talking about is "our" concept of disease—comprehensive medici

ncept of disease. After all, we are doctors, and I hope that later in the scussion we will have time to indicate how this comprehensive edical approach can be infiltrated into medicine. But what is actually e difference between the common current notion of disease which is ld by most people and the view of comprehensive medicine? Dr. ngel has already indicated that in one relationship—namely, that of berculosis—the disease tuberculosis occurs only when the person mes in contact with the bug, or the germ, or the bacillus—whatever is you call it. This unitary theory is aided and abetted in many ways our current magazine articles and various other aspects of this type unitary pathology; whereas, actually, traditional medicine in recent ars has been undergoing a change. And I think that this change has en in terms of recognition of the many factors that enter into it—that the mere presence of the germ in itself is not sufficient, and y attempt at understanding illness, purely in terms of a single fac-r, acting on a single organism, fails to take into consideration what think psychiatry really has to offer, namely, a kind of multiple proach and understanding of all the variables that enter in and the eighting.

Dr. Grinker: Then, as we see it, the patient has his disease, which a degree of failure of adjustment; and, now that his symptoms are esent, which are called disease, he has to make a new kind of adap-tion. He has to change his way of living. He has to change his re-tionship to other people; sometimes, as Engel pointed out, he has to to a sanitarium. But there are many other ways in which he may ve to restrict his life. And all these bring on a new form of adap-tion not only for himself but for others around him. The psycho-gical factors influence also the patient's adjustment and reaction to erapy and to treatment, do they not?

Dr. Engel: Yes. It stands to reason that the patient in coming to a ctor should know that all these stresses, some of which may be own to him and some of which may actually not be known to him, e going to be taken into consideration by the doctor. Too often the ctor focuses attention exclusively on one aspect of the illness.

Dr. Grinker: This means that our comprehensive medicine requires different orientation by the doctor. There seem to be required meth-ls which are over and above the actual treatment of the infectious

agent or the reaction within the body. There have to be methods whic deal with other aspects.

Dr. Kaufman: Is that not where your Institute comes in? You a set up to do actually modern medicine—to sort of sensitize, let us sa the coming doctor, your new residents, both in psychiatry and in med cine, so that they become aware of the multiple factors. That will lea it seems to me, not only to a different approach to the problems medicine but to a different kind of doctor. That is not to say that t present-day doctor is not doing his job, but, as Dr. Engel has sa before, comprehensive medicine and the contribution of the psychi trist leads to a broadening and an understanding of the complexi involved in the relationship between the patient and his illness, t patient and his doctor, and, more important, a doctor and his patie

Dr. Grinker: You have been engaged in teaching medical studen Engel. How do you envisage the training of medical students to co into this new field of comprehensive medicine?

Dr. Engel: We have come to feel that the training of the medic student must be changed to take into account this total process of a justment, to take into account all the factors which may have bearin on illness, whether it be biological or psychological or social. Thus our training of medical students we emphasize very strongly that t student must understand and must investigate all the aspects of t patient's adjustment and not merely the specific ones which may most obvious.

Dr. Grinker: In other words, you are not training them to beco psychiatrists?

Dr. Engel: No.

Dr. Grinker: But you are training them to have an understandi and a sensitization to the multiple factors concerned in disease. On t other hand, they must be able to recognize when, as a result of th knowledge of the patient's multiple problems, the treatment situati requires a psychiatrist.

Dr. Kaufman: Just in the same way as the general practitioner the internist or any other practitioner of medicine will recognize a s gical condition but does not feel qualified himself to act as a surge

I do not think that there is any basic difference in principle here, and am delighted to hear that Dr. Engel says that he is not training all is medical students to become psychiatrists. My own feeling is that ne major contribution which the psychiatrist can make to medicine s not necessarily in training more psychiatrists, although we know that ney are needed, but in transmitting this point of view to the doctor nd the practitioner of medicine.

Dr. Grinker: There is another change which would necessarily occur the field of comprehensive medicine develops, and that is a different rientation of the patient himself to the treatment process. The patient ow can no longer assume that his disease is something which only omes from without. He cannot simply go to the doctor and say, "Give ne some medicine to cure this disease; give me a surgical operation o cut out the area that is diseased."

He will come to recognize that the disease and he are one and that ne treatment in his relationship to the doctor imposes upon him a unction, a work process, in which he has to learn, through clarifica- on, the meaning of his symptoms as they are expressions of difficult djustment and become aware in certain cases of the unconscious forces hich are perpetuating his invalidism. That brings into consideration ne fact that in some cases the techniques of therapy are extremely long hen we are particularly dealing with the unconscious.

Dr. Kaufman: Yes, that is true. It is unfortunate that with our pres- nt state of knowledge certain therapeutic techniques are long. Never- heless, there are two aspects to the problem. One is the treatment, and ne other is the knowledge of what is wrong. I feel that the psychiatrist as two contributions. One is the contribution to the understanding of lness; and the other is the contribution to the treatment.

Dr. Grinker: We often see patients who are suffering from what e call "dis-ease," who are undergoing treatment, and who react in a ay which indicates that they are worsened. Is there any danger in reating certain diseases?

Dr. Engel: Yes, we often fail to recognize that the symptom, that of hich the patient complains, represents an attempt at adjustment. We ave seen recently some very striking illustrations of this in the use of me of the new drugs like ACTH, where we have a pharmacologic. We have a drug which has the property of being able to dissipate, very

quickly, a physical disability. And at times this may be followed b certain disturbing symptoms, often psychological symptoms. I thin particularly of a young man with arthritis of many years who, whe his joint stiffness dissolved in twenty-four or forty-eight hours, bega to feel very panicky and expressed it by saying, "I'm not used to havin my muscles so loose. I don't feel ready." He had suddenly had his ad justment to an illness disturbed.

Dr. Grinker: How would you recapitulate your understanding o this broader concept—this added factor of comprehensive medicine?

Dr. Engel: I would say that we must view disease and health as process, a process of adjustment in which, when it is successful, w conceive of it as health; when it is unsuccessful, we think of it a disease.

Dr. Grinker: And this means a reorientation of the approach t therapy, does it not?

Dr. Kaufman: It means a reorientation of many aspects of the pra tice and training of physicians.

Dr. Grinker: We have talked today about psychiatry as a study an a treatment of the whole organism in health and disease, using ever level of activity, from the cellular to the social. It includes also, o course, the study of what has been called the purely mental. This is field upon which we have not touched today, but this same compr hensive approach we apply to these serious mental conditions whic indicate that there are neuroses and psychoses. These also are ada tations to stress, and they pose for us the problem of what are th somatic, the physical sources, of these disturbed emotions which are e pressed on a higher level but are still reactions which can be unde stood as processes of adaptation. And it is to that end that our Institu has been dedicated this week end.

MIND AND MATTER*

By W. RUSSELL BRAIN

President, Royal College of Physicians, England

THE problem of mind and matter has been discussed for over 2,000 ears and you may well wonder what there is new to be said upon this pic, but I accepted the invitation to speak about it because it seems to ie timely to look at the question again in the light of two develop- ients of thought during the last twenty-five years. The first is the great crease in our knowledge of neurophysiology and especially of the ectrophysiology of the nervous system. The second is the contribution those philosophers who are particularly concerned with semantics. hey may often go too far in supposing that problems are purely verbal, ut they have rendered a great service by directing our attention to the rge part which verbal confusions play in creating difficulties, and ave thereby clarified our thought. That they have not achieved more , I think, due to the fact that, with the notable exceptions of Edding- on, Whitehead and Russell, no modern philosopher seems aware of the nportance of the part played by the body in perception and thought, nd current philosophies of perception either dispose of such questions merely verbal or are satisfied with very naive armchair solutions.

This is at best a difficult subject and if we are to understand even how ie difficulties arise we must depart somewhat from the time-worn aths of approach. Let us begin by considering the use of the words mind" and "matter." Evidently people think that they mean some- ning when they use these words, and they do not think that they are the habit of using them for the same events. Going no deeper than ie verbal level, if the distinction between the words "mind" and "mat- r" means anything we should try to understand what it means, and if does not mean anything we should be clear about that also.

Philosophers and other thinking people who have assumed that there some distinction between mind and matter have been chiefly con- rned with two different questions: (1) What is the relationship

* From a talk presented by the Third Programme of the British Broadcasting Corpora- on as a part of a series on "Mind and Matter" (printed in *The Listener*, April 19, 1951).

between those events we call mental and the collection of matter which we call our brains? (2) Are the things which we perceive with our senses wholly material or, as some have thought, wholly mental, or partly one and partly the other? As we shall see, these questions are intimately related to one another. People sometimes put it in this way: "Is matter *really* mental?" or "Is the mind *really* a manifestation of the matter of which the brain is composed?" Evidently there is something which they mean by matter which, at first sight at any rate, is different from mind, and conversely—whatever these two terms may turn out to represent when we get to know more about them.

Let us, without attempting to define matter, look at some instances of the use of the term. If we ask someone to give us examples of matter he might say that it consists of solids, liquids and gases, or that it exists in the form of tables and chairs, muscles and bones, nerves and brains. If we then say: "What do you mean by the mind, or what would you regard as mental?" he might find it more difficult to reply. Thought would certainly seem to be mental, for thinking is perhaps the most characteristic function of the mind, as we use the term. Feeling and willing? Yes, those would probably also be regarded as mental. But what about sensation? Is there something mental about colours, touches and sounds? Here we should begin to get into a difficulty; in fact we should find ourselves at once involved in the ancient controversy between the idealist and the realist. On the one hand, if we regard sensations as a state of consciousness and assume that the mind is somehow involved in consciousness, we can make out a case for treating them as mental, but on the other hand the colour of the table certainly seems to be in some way part of the table, though the sound of a bell is not in quite the same way part of the bell, and a touch on my hand appears to come into yet another category, because it is not exactly part of the object touching me nor can it be described as part of my hand.

Instead of talking about isolated sensations, let us think of a solid object which I hold in my hand. I perceive that object through touches and pressures, and feelings of heat or cold, together with information derived from the posture of my fingers and the extent to which they are separated by the object from the palm of my hand. Are all these sensations mental or are they part of the object? If I feel that a stone in my hand is cold, I do so only because it causes a fall of temperature in

y skin which makes my fingers colder than they were and excites rtain nerve endings. Yet I usually speak of the stone and not of my nd as being cold, though I can remember a small child putting his nd in the river and saying: "I am going to feel my hand in the ater."

Let us leave this question on one side for the moment and turn now what we call the world of matter. How do we know about the bles and chairs, about other people's bodies and brains, and for that atter, about our own bodies and brains? Let us see what happens hen somebody else, whom we will call the observer, sees a colour hears a sound. The physical stimulus, as we call it, excites the appro- iate receptor organ, in this case the eye or ear, and this in turn starts electrical impulse in the corresponding nerve running to the brain. hese nerve-impulses differ somewhat in minor details, including the te at which they are conducted towards the central nervous system, t they are substantially alike, and no neurophysiologist believes that fferences in the nature of the impulses conducted by the ingoing rves correspond to differences in the kind of sensation which they ad us to experience. Thus, merely from recording the electrical dis- rbances which accompany the passage of a nerve-impulse and observ- g their characteristics, it is impossible to say whether the sensations ith which they are concerned is one of sight, hearing, sound, taste or uch, and, indeed, it is not until such nerve impulses reach what may called their end-stations in the brain that we experience a sensation all. It would seem, therefore, that what determines our awareness a sensation, and also its nature, is the arrival of a nerve-impulse, or ore probably a series of nerve-impulses, at the appropriate end-station the brain.

We have other evidence in support of this view, for clinical neurology aches us that we can experience a sensation without any sensory rgan being excited, and without any impulse travelling up an ingoing rve. All that is necessary is that the appropriate area of brain should excited in some other way. Thus, we know that if one of the end- ations of the brain normally concerned with sensation is stimulated the electrical discharge which underlies an epileptic fit, or by the sturbance which constitutes an attack of migraine, the patient will perience a sensation corresponding in quality to the area of brain

excited, and we know further that a very wide range of sensations, in cluding sight, smell, sound, taste, touch and others, can all be repr duced by exciting the appropriate area of the brain surface, some o them even by the surgeon using an electrical stimulus on the conscio patient. It is true that the sensations produced in this way are usually o a somewhat crude kind, but then the stimulus is of a crude kind, an when once the principle has been accepted that the application to th brain of a stimulus which is capable of evoking a response will produ a sensation, there is no reason to doubt that if we were able to deliver more refined and complicated stimulus, complicated in its organisatio both in space and time, we could reproduce more complex kinds o sensation.

What follows from this? We have seen that a physical stimulus e cites a sensory receiving-organ, and this a nerve-impulse, which is in n way like the original physical stimulus, and that this in turn sets goin a disturbance in the end-station in the brain which is probably in ce tain respects unlike the nerve-impulse, and certainly is quite unlike th original physical stimulus, and it is upon this disturbance in the bra that sensation depends. Hence the brain state which constitutes th physical basis of a sensation is always quite unlike the physical stimul which impinges upon the body and which has been in one way or a other directly set in motion by the external object which we experienc Thus, the relationship between the brain state which underlies the se sation and the physical object of which that sensation makes us awa is merely that the brain state is the last of a series of events caused b the physical stimulus. Whatever the relationship between the bra state underlying a sensation and the corresponding awareness of t sensation in consciousness it would seem to follow that the sensati must be quite unlike the physical stimulus originating in the outsi world and exciting the sense-organs.

It follows also that the experience of a given sensation must alwa be later in time than the physical event which initiates it. Indeed, must be later in time than the excitation of the receptors on the surfa of the body by that physical event, since the nerve-impulse takes tim to travel from the surface of the body to the brain. How much later time it is than the physical event will depend obviously upon the d tance of the object concerned from the body and the rate of propagati of the physical stimulus through the intervening medium. The spe

f light is so great that only a fraction of a second passes between the me when a light wave is reflected from any object on the earth and e time when it strikes the eye of the observer. This interval is so short at for all practical purposes it can be neglected, and we normally pay o attention to it. We behave as though we see something happening the very moment at which it happens. We cannot do this, however, the sphere of astronomy, where years may pass between the moment which a light wave leaves a star and that at which the eye perceives . If it takes several years for the light from a star at which I am now oking to reach my eye, the star can no longer be in the position at hich I see it, and, indeed, if it had ceased to exist in the interval be-veen the present moment and that at which the light wave left it I ould have no means of discovering the fact. Owing to the relatively ow speed of sound compared with that of light this anomaly may come obvious even on the surface of the earth when sound is con-rned. The sound of a jet-plane comes from a different point in the y from that at which we see the aeroplane.

So we reach the idea that the only necessary condition of the observ-'s seeing colours, hearing sounds and experiencing his own body that the appropriate physiological events shall take place in the appro-riate areas of his brain. If these are of the right kind the same sensory xperience will occur irrespective of whether they are caused solely by local change in the brain or by a long chain of events originating in e external world. But if we ask the observer where the events he is xperiencing are, where he sees the colours, hears the sounds or feels art of his body, he does not point to his brain, he points to or describes me region of the external world or some part of his body itself exter-al to his brain, and he does the same whether his sensations are pro-uced normally—by events external to his brain, or abnormally—by isease processes occurring in the brain itself.

Here, then, is a problem. An event in the observer's brain causes him experience something—*e.g.* see a colour outside his brain. This is hat neurologists and psychologists often call "projection," but this is ot a very good name for it, for projection seems to imply throwing mething from one place to another, but the colour the observer sees never anywhere else but where he sees it. He is not aware of any rocess that could rightly be called projection. The idea that sensations e in this way, at it were, manufactured by the brain and somehow or

other manage to get outside it into the external world is known "physiological idealism."

Now let us look at the external world as the observer perceives it. is hard or soft, coloured, scented, tasty, and composed of objects whi have position and may move about. As we have seen, the time-relatio ships of the observer's external world are peculiar. If an event in causes a sound, he hears it, not when the event occurs, but when t sound, as we say, reaches his ear, or, more precisely, a little later, wh the nerve impulse from his ear has travelled as far as the part of h brain surface concerned with hearing. Similarly, he sees an object, n when the light wave leaves it, but when the visual nerve-impulse h reached his brain, and in the astronomical world this may be 1,0 years after the event which originates the light wave.

Consider two stars, one 500 and one 1,000 light years away: the o server sees them both at the same time, but the events he perceives the stars—*i.e.* the emission of light waves—happened 500 years apa So events which the observer perceives simultaneously are not nec sarily simultaneous. In fact the observer's perceptual view consists events which stretch away into the past in proportion as they are d tant from him in space, but which are on one time-scale for vision a another for hearing, in proportion to the differences between the spe of sound and of light.

What about the body? Surely we have a direct and immediate awa ness of that? No, the same principle applies. All the observer's perce tion of his own body is awareness of its immediate past, for he is n aware of the prick of a pin until after the interval of time necessary f a nerve-impulse to travel to his brain from the part of the body wh has been pricked.

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